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ABSTRACT

Results of an experimental study in India comparing two alternative procedures for teaching the set English text for class IX are examined against the background of the general mental ability, verbal reasoning ability, numerical reasoning ability, and general intelligence of the pupils. Other variables considered in the analysis are sex, age, and socioeconomic background. The two procedures compared are the oral presentation of structural and vocabulary items: (1) independent of the reading passage, and (2) in the context of the passage. Procedure 1 appears to be weighted against pupils with higher general intelligence. Procedure 2 is more effective with students of average general intelligence. This successful method, which relates language drill to actual communicative activity, should be adopted by language instructors since it increases reading comprehension, one of the major tasks of teachers in India. Extensive tables and graphs display all the data obtained in the study. (PMJ)

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Comparison of two E.L.T Procedures—An Experiment in Applied Psycholinguistics

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ABSTRACT

Results of the experimental study comparing the two alternative procedures for teaching the set English text in class IX are examined in the background of the general mental ability, verbal reasoning ability, numerical reasoning ability and general intelligence of the pupils. The two procedures compared are the oral presentation or structural and vocabulary items (1) independent of the reading passage and (2) in the context of the reading passage. Procedure 2 is found to be more effective for the pupils with average general intelligence. Procedure 1, on the other hand, appears weighted against higher general intelligence.

1. Introduction

The analyses and discussions in the following pages are a sequel to a recent paper by the author (Pal, 1973, referred to in the following pages as paper 1) reporting the findings of a study carried out to examine the relative merits of two alternative procedures for teaching the set English text in Class IX. The two procedures compared were :

Procedure 1 : The oral presentation of structures and vocabulary items without reference to the reading passage; and

Procedure 2 : A multi-skill presentation, viz., quick oral presentation of structures and vocabulary in the context of the reading passage.

The results of this study (summarised in Table 1) suggested that the procedure 2 provides comparatively better overall proficiency and also appears to be superior to procedure 1 in increasing the level of reading comprehension.

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TABLE 1

*Synopsis of the results of the experimental study comparing the two ELT procedures**

	Group A (Procedure 1) (% Score)**	Group B (Procedure 2) (% score)**	Comparison of Groups A and B		
			Computed 't' statistic	Standard 't' value at p=0.05	Significance of difference
Overall proficiency					
(i) diagnostic test ...	22.8±8.7	29.9±3.2	0.37	2.042	Insignificant
(ii) final test ...	42.0±7.2	51.0±9.4	2.17	2.042	Significant
Reading comprehension					
(i) diagnostic test ...	37.0±6.0	42.3±8.0	1.51	2.042	Insignificant
(ii) final test ...	40.3±10.0	50.0±8.0	2.22	2.032	Significant
Proficiency in grammer					
(i) diagnostic test ...	26.0±7.0	29.1±6.0	1.05	2.042	Insignificant
(ii) final test ...	36.6±7.0	39.3±14.0	0.52	2.040	Insignificant
Writing ability					
(i) diagnostic test ...	18.4±9.0	21.0±4.0	0.79	2.042	Insignificant
(ii) final test ...	36.0±9.0	38.7±10.0	0.60	2.040	Insignificant
Vocabulary level					
(i) diagnostic test ...	31.4±10.0	24.6±8.0	1.60	2.042	Insignificant
(ii) final test ...	53.4±11.0	47.0±13.0	1.31	2.042	Insignificant

*Data reported by Pal (1973).

**$X \pm (35/N \pm)$, where X is the arithmetic mean of N data and S is the standard deviation.

Some psychological tests were subsequently administered to these pupils to ascertain their general mental ability (GMA), and I.Q. (intelligence quotient) to examine if these factors were in any way responsible for the observed differences between the two procedures. Results of this and their analyses are presented here.

2. General Mental Ability

The general mental ability (GMA) of these pupils was ascertained using a group test (in Telugu, i.e. the pupils' mother-tongue) constructed and standardised by Goverdhan and Ravichandra (1971). This test, of total 65 question items, comprises 40 questions relating to verbal reasoning, 20 relating to numerical reasoning and 5 relating to abstract reasoning. According to the norms developed by Reddy and Ravichandra (1972) for this test, the pupils can be grouped into 5 mental ability groups on the basis of their performance. These data for the two groups of pupils are shown in Table 2 and Figure 1 where it can be seen that there were no significant differences in the general mental ability, verbal reasoning ability and numerical reasoning ability of the pupils of the two groups. Nor do these two groups appear different in any other characteristics. The parental occupations of these pupils, summarised in this table, have been classified according to the following grouping suggested by Reddy (1971) :

A. *Administrative* : Government officers, business executives and managers of firms etc.

B. *Professional* : Engineers, doctors, lawyers, teachers etc.

C. *White Collar* : Clerks, accountants, office superintendents etc.

D. *Business* : All types of traders.

E. *Agriculture* : Farmers, agricultural labourers etc.

F. *Manual Work* : Skilled workers (mechanics, masons, carpenters smiths, car drivers etc.) and unskilled workers (e. g. labourers, porters, rickshaw pullers, watchmen, peons etc.)

Over 55% of the pupils in group A, over 65% in group B, and over 60% of the total pupils belonged to the "White Collar" parental background. No significant differences between the two groups can thus be observed in Table 2 in (i) pupils' age, (ii) sex-wise distribution of the pupils, (iii) fathers' occupation, and (iv) fathers' income, (v) General

TABLE 2

Comparison of the pupils of the two groups

		Group A	Group B	Overall
1.	Age (at the commencement of the study in August 1972) (in years)	13.6±0.7	13.8±0.8	13.7±0.8
2.	Overall marks (%) secured in the Class VIII Annual Examination	40.6±7.6	39.7±7.8	40.1±5.5
3.	Marks secured (%) in English in the Class VIII Annual Examination	29.7±8.4	26.6±10.2	28.1±6.3
4.	*Sex-wise distribution*:			
	(A) Number of girls	4	7	11
	(B) Number of boys	15	12	27
5.	*Father's occupation**: (number of pupils)			
	(A) Administrative	3	0	3
	(B) Professional	4	2	6
	(C) White collar	10	13	23
	(D) Business	0	1	1
	(E) Agriculture	1	1	2
	(F) Manual work	0	2	2
6.	*Father's income (Rs. p.m.)*	360±65	350±95	355±55
7.	*General Mental Ability*:			
	(i) Mean score (%)	44.5±8.5	45.4±10	45.0±6.6
	(ii) Clasification** (number of pupils)			
	(A) Superior	0	1	1
	(B) Above average	4	7	11
	(C) Average	11	7	18
	(D) Below average	3	4	7
	(E) Inferior	0	0	0
8.	Verbal Reasoning Ability–(Mean score) (%)	48.7±7.5	50.4±9.4	49.6±5.4
9.	Numerical Reasoning Ability (Mean score) (%)	42.7±12	40.0±14.5	41.4±8.4

*Classification according to Reddy (1971).

**Classification according to the norms developed by Reddy and Ravichandran (1972).

Note: One pupil, belonging to Group A, was not available when the G.M.A. and related tests were administered.

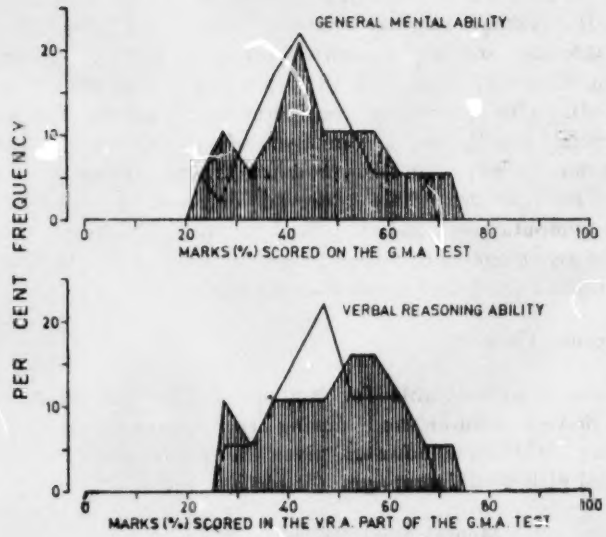


FIGURE 1

Frequency diagrams for the General Mental Ability and the Verbal Reasoning Ability scores of the pupils of Group A (open) and Group B (hatched).

Mental Ability, (vi) Verbal Reasoning Ability, (vii) Numerical Reasoning Ability. The data in Table 2 thus confirm the author's (Pal. 1973) contention that the two groups were statistically identical in all the conceivable characteristics at the commencement of the experiment.

An attempt can now be made to examine any relation that exists between the general (or verbal) intelligence of the pupils and their over-all progress (or progress registered in specific aspects such as reading comprehension, proficiency in grammar, writing skill and vocabulary level) in the course of instruction imparted during the experiment. It may be mentioned at this stage, however, that the GMA scores obtained from the present GMA test are not normalised for age. The ages of these pupils varied from 12 to 17 years (13–18 years at the time the GMA test was administered). This should be considered significant for GMA purposes because general intelligence is directly proportional to age in this age-range (Anastasi, 1961). [In the present GMA test, however, the authors (Reddy and Ravichandra, 1972) observed decrease in pupils' scores with age.] For computational and analytical purposes, therefore, it was found necessary to use an age-normalised parameter instead of the GMA scores. I.Q. (intelligence Quotient) is one such parameter.

3. Intelligence Quotient

No norms are available for computing I.Q. from the scores of the GMA test that was administered during the present study. Reddy and Ravichandra (1972) have, however, given the GMA scores, for this test, of the boys and girls of different ages (Table 3). Since,

$$\text{I. Q.} = \frac{\text{Mental Age} \times 100}{\text{Chronological Age}} \qquad \text{— (1)}$$

This can also be expressed as,

$$\text{I. Q.} = \frac{\text{Pupil's actual G.M.A. score} \times 100}{\text{GMA score expected at the pupil's age}} \qquad \text{— (2)}$$

The denominator in relation (2) above can be read in Table 3 and thus I.Q. can be obtained from the GMA scores. For instance one 16 year old girl, scored 28 (out of 65) in this GMA test. Since the mean score for a 16 year old girl is 26.54 (Table 3), this gives the I.Q. of this girl as 106. In view of the uncertainties involved in the computation of I.Q. in this manner, the values thus obtained are referred to as "General Intelligence" (G.I.) here.

TABLE 3

*Age dependence of the G.M.A. scores**

Age	Boys**		Girls**	
	$\bar{X}$	S	$\bar{X}$	S
14 years	32.9	11.4	28.8	7.8
15 years	32.6	10.6	27.4	7 6
16 years	29.6	10.8	26.5	7.6
17 years and above	26.3	9.3	25.6	6.7

*After Reddy and Ravichandran (1972).
**Scores out of 65 marks.

TABLE 4

General Intelligence of the pupil of the two groups

G.I. Class	G.I. Range	Group A			Group B			Overall		
		N	$\bar{X}$	S	N	$\bar{X}$	S	N	$\bar{X}$	S
Higher	>115	4	129	7	6	136	8	10	133	8
Average	80–115	9	91	6	8	96	13	17	93	10
Lower	< 80	5	65	7	5	60	8	10	63	8
All combined		18	92	23	19	94	30	37	93	27

On the basis of the G.I. scores also the two groups of pupils are found to be comparable (Table 4 and Figure 2). These pupils can thus be considered, for group-wise comparison of the progress registered by them, in 3 G.I. classes : higher (i.e. the top one-third, with G.I. scores over 115), average (i.e. the middle G.I. range of 80–115), and lower (i.e. the last one-third, with G.I. scores less than 80).

4. G.I. and the progress during instruction

An attempt can now be made to compare the progress registered by the pupils and their G.I. scores. As stated in paper I, two measures of progress in the overall proficiency were used : (i) marks secured in the objective-type tests and (ii) marks secured in the school examinations. The difference of the marks secured in the final (F) and the diagnostic (D) tests can thus be treated as a measure of the progress registered by a pupil. In the case of school examinations the marks secured in the IX and VIII class annual examinations are taken to be F and D respectively here. When the progress registered by the pupils of the two groups, computed in this manner, is considered in the background of their G.I. scores (Table 5) it appears that :

(i) The Group B pupils registered slightly better progress than the Group A pupils.

(ii) In the case of objective-type tests, the pupils with higher G.I. scores registered better progress.

(iii) In the case of school examinations ; no dependence of progress on G.I. scores is seen in Group A whereas in Group B the pupils with average G.I. scores registered maximum progress compared to the almost equal progress registered by those with higher and lower G. I. scores.

It may be noted at this stage that the raw progress scores computed here do not give any weightage to the initial levels of the pupils. Compare two pupils for instance, pupil A with 20 marks on the diagnostic test (D) and 40 marks on the final test (F) and pupil B with 40 and 60 marks at these two levels respectively. In terms of raw progress scores both appear to have made the same progress of 20 marks. The maximum of 100 marks can be secured in the objective-type tests used in this study, and the pupils A and B have the scope for possible improvement of 80 and 60 marks

TABLE 5

G.I. and the pupil's progress in overall proficiency

General Intelligence	Progress gauged from the Objective-type tests				Progress gauged from the school examination			
	Group A		Group B		Group A		Group B	
	$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S
Higher	16	8	26	7	15	5	16	9
Average	13	8	22	10	19	14	30	10
Lower	12	4	15	3	19	9	12	6

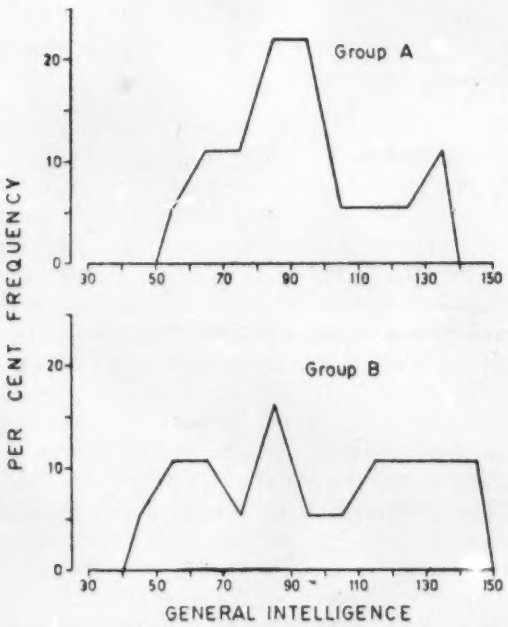


FIGURE 2

Frequency diagrams for the General Intelligence scores of the pupils of Groups A and B.

respectively. This can be given due weight by computing the progress (PR-I) in the following manner :

$$\text{Progress (PR 1)} = \frac{\text{Actual improvement} \times 100}{\text{Possible improvement}} \qquad \text{— (3)}$$

On this reckoning, pupil A has made 25% progress as against (33.3%) progress made by pupil B. This measure appears heavily weighed against pupils with lower initial scores. Another measure (PR 2) given by :

$$\text{Progress (PR 2)} = \frac{\text{Actual improvement} \times 100}{\text{Initial score}} \qquad \text{— (4)}$$

which gives higher credit at the lower end can be used in addition. The PR 2 scores for pupils A and B are 100% and 50% respectively. Probably the least-biased estimator of progress (PR) will then be the average of PR 1 and PR 2, or

$$PR = (PR\ 1 + PR\ 2)/2 \qquad \text{— (5)}$$

Thus the PR scores for pupils A and B are 62.5% and 41.7% respectively, which give due weight to the pupil's initial score as also to the scope for his possible improvement.

When the score-variants have been filtered in this manner, the results of the objective-type tests (Table 6) reveal (i) almost identical progress for the three G.I. classes in Group A and (ii) increase in progress with G.I. in Group B. The question is whether this indeed reflects some intrinsic difference between the two teaching procedures. Examination of this necessitates the filtration of another error-causing variation, the G.I. effect, since pupils with higher G. I. (or I.Q.) tend to register higher progress irrespective of the teaching strategy employed (Olsson, 1969). The G.I. effect can be statistically controlled by the analysis of covariance (Lindquist, 1953). The correction for G.I. in effect, means compensating for the lesser "ability" of the low G. I. pupils by suitably enhancing their progress scores and correcting for the higher "ability" of the high G.I. pupils by reducing their progress scores. The progress scores in Table 6, when adjusted for the G.I. effect in this manner, would suggest an inverse linear dependence of progress on G. I. in the case of Group A (i. e. the tendency for the higher G. I. to be associated with lower progress) and a parabolic dependence of progress on G.I. in the case of Group B, (i.e. the tendency for higher progress to be associated with average G.I.). In other words, G. I. corrected progress (scores) will show more or less the same dependence on G.I. shown by the progress computed for the results of school examinations given in Table 5 and Figure 3. It is equally likely

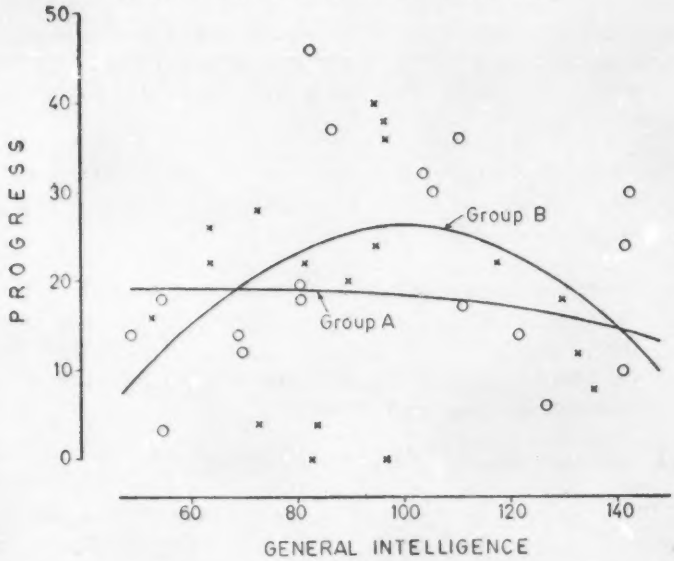


FIGURE 3

General Intelligence versus overall progress registered by the pupils of Groups A (crosses) and B (circles).

TABLE 6

General Intelligence and the corrected progress*

G. I. Class	Group A		Group B	
	$\bar{X}$	S	$\bar{X}$	S
Higher	35	17	65	15
Average	34	21	52	21
Lower	37	14	42	10
All combined**	35	18	53	17

*Progess computed after giving weightage to (1) scope for possible improvement and (ii) initial score (refer to the text).

**The Group B pupils registered higher progress ($53\pm12\%$) than Group A pupils ($35\pm12\%$) at a satistically significant level ($P=0,05$).

that no perceptible dependence of progress on G.I. will be noticed in the case of Group B. Since Groups A and B were taught according to Procedures 1 and 2 respectively, the above discussions lead to the following inferences :

(i) Procedure 2 results in a comparatively better overall proficiency (this can be appreciated from the significantly higher mean progress score for Group B in Table 6).

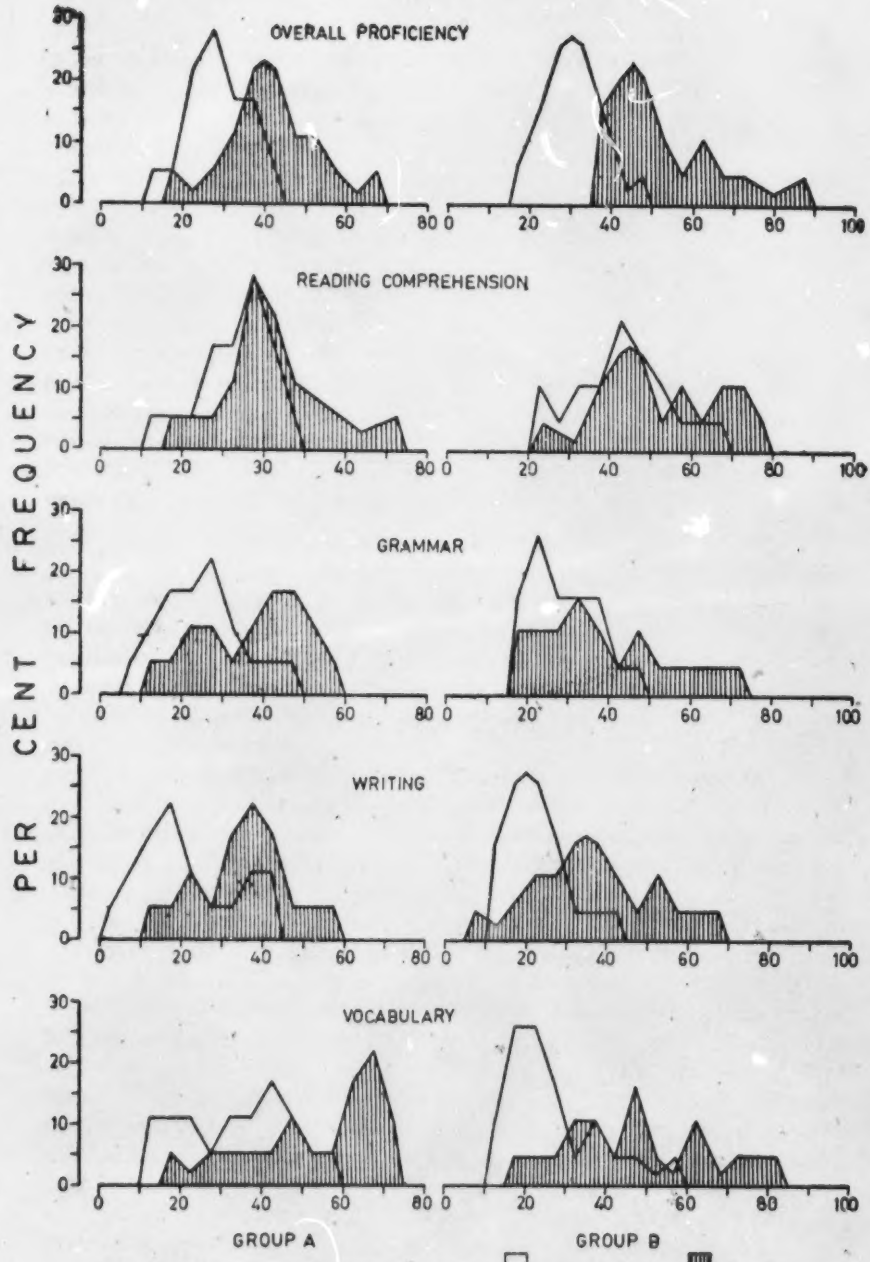
(ii) Procedure 2 was found more effective for the pupils with average G.I. whereas in the case of Procedure 1 the progress bore a very feeble approximately inverse-linear relationship with G.I. (this can also be appreciated from Figure 1 in which the school examination data are graphically shown).

5. G.I. and relative merits of the two procedures

When the progress registered by the pupils of the two groups in the four areas of language learning (i. e. reading comprehension, grammar, writing and vocabulary), in which they were tested, is examined in the background of the G.I. scores (Figure 4) no pronounced distinctions between the two procedures can be made. Although correlation trends for the two groups are shown in this figure, it will be futile to base any inferences on these in view of the large scatter in the data. The superiority of Procedure 2 over Procedure 1 in increasing the level of reading comprehension (observed in the I paper, also seen in the results summarised in Table 1 and Figure 5 here) thus appears to be an intrinsic advantage of Procedure 2 without any apparent dependence on the intelligence fact

6. Concluding remarks

It is a common observation that decisive and categorical results can hardly be expected in the studies of the type attempted here. Even when the teacher-variant is effectively eliminated or eliminated, say by using "canned" lessons as was done in the Pennsylvania and GUME Projects (Carrol, 1969 ; Levin, 1969 ; Linblad and Levin, 1970 ; Levin and Olsson, 1971) or by using only one teacher when a fairly small number of pupils is involved as in the present case, the pupils' receptivity (learning and absorption abilities) and background introduce uncontrollable variants. Two possibilities can probably be explored to obtain "clear-cut" results. One is to conduct such studies on pupils who have had little (insignificant) or no exposure to the concerned second or foreign language so as to have a natural zero-point in second language acquisition (Carroll, 1963) to start



THE MARKS (%) SECURED IN INITIAL (□) AND FINAL (▨) TESTS

with. Another possibility is to statistically amplify the 'signal-to-noise' ratio, i.e. to employ such statistical techniques as may enhance the detection limit. With the experiences of the Pennsylvania and GUME Projects in view, however, one can hardly hope, at the present juncture, for greater statistical power and planning and execution care to provide more categorical results in such experiments in applied psycholinguistics. More often than not the teaching strategies being compared in an experimental study themselves have many common facets contributing to the already great number of variables involved in the instructional situation (Bosco and Di Pietro, 1970). It is thus difficult to single out any strategy for its universal superiority (Scherer and Wertheimer, 1964 ; Palmer, 1965 ; Rivers, 1968 ; Carrol, 1969 ; Levin and Olsson, 1971 among others) although it is difficult to agree with Pattison (1970) that teaching method comparison should be a forbidden field for any future research in foreign language teaching methodology. Comparative research does remain a major potential guide, in the long term perspective, in bringing about educational reforms.

It is in the background of all these that the results of the present and the previous study (i. e. in Paper I) have to be evaluated. Neither the attempt during this study has been any 'once-for-all-definitive' identification of an effective teaching strategy, nor has this study been prompted by the current debate on behaviorist versus generativist theories of language learning and their relevance in foreign language acquisition (Carroll, 1965; Jacobovits, 1968; Chastain, 1969). Both the procedures compared during this study involve good measure of pattern drill which is indeed important in the learning of a language (Brooks, 1960). The difference between the two lies in the fact that Procedure 2, unlike Procedure 1, presents the structural and vocabulary items in the context of the reading passage. Since relating the drill to the actual communicative activity increases the effectiveness of the drill (Newmark and Reibel, 1968; Oller and Obrecht, 1968), it is not surprising that Procedure 2 resulted in better reading comprehension than Procedure 1. Improvement in reading comprehension if one major task before the English language teachers in India (Teaching of English, 1971). This is where the results of this study gain considerable immediate relevance as well. The better improvement registered in the reading comprehension of the pupils taught according to Procedure 2, as indicated during the present and the previous studies, suggests that this procedure should be favoured instead of Procedure 1 in the English language teaching programmes in the country. The bias of Procedure 2 for pupils with average intelligence is another advantage of this procedure over

Procedure 1. As has been stated earlier, however, the results of this study are not categorical and should hence be treated with caution.

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